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CHEMICAL MAGIC



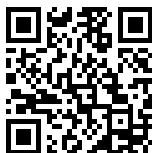
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Twin Cities Campus



GILBERT CHEMICAL MAGIC

A Presentation of
Original and Famous Tricks in Conjuring
Accomplished by the Use of
Chemicals

BY

A. C. GILBERT

Yale University, 1909



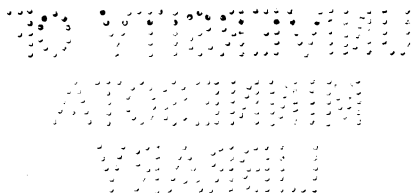
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FOREWORD

Here's real fun! Tricks with chemicals which will mystify and amuse your friends!

Gilbert's Chemical Magic is a new idea in conjuring. We have our Gilbert's Tricks with Coins, with Handkerchiefs, with Cards, the Miscellaneous Magic Tricks, and now we have Tricks with Chemicals. There is really double fun in Chemical Magic because, besides being very mystifying to those who are uninitiated, you are given the chemical explanation of what takes place, so that you will actually learn quite a little about chemistry. Many of the tricks we describe here have been performed by some of the best spirit mediums, who have not only mystified but convinced people that the tricks were accomplished with the aid of the spirits or by means of some superhuman power. We explain how they are performed by purely natural means. The real fun lies in knowing how to do them and in mystifying your friends.

There is no danger to be feared in using the various chemicals necessary for the presentation of the tricks described in the following pages. However, you are cautioned not to attempt any combinations with the chemicals other than the ones given, and to follow directions closely.

A.C. Gilbert

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TABLE OF CONTENTS

We have divided the tricks described here into three groups:

1. Chemical Magic.
2. Combination Tricks
3. Miscellaneous Experiments.

GROUP I

The Great Smoke Mystery
Changing Water to Wine
Changing Wine to Water by Passing Hand Over Glass
Pour Milk from a Milk Bottle Full of Water
Pour Wine from Pitcher of Water, Pour Back and it is Water Again
Turning Iron Into Copper
Ink to Water
Water to Ink
Second Sight
Magic Writing Ink
Changing Burgundy into Sherry
Extraordinary Wine, Water and Milk Trick
Mysterious Glasses
Mysterious Jug of Water
The Flags of Victory

GROUP II

Fiat Lux (Let There Be Light!)
Prohibition vs. Wines
Changing Wine to Water
Latest Flying Glass of Water
The Vision of Belshazzar

GROUP III

The Magic Rose
Chemical Barometer
The Magic Picture
The Magic Power of Mental Concentration
The Magic of Ammonia
Flash Paper
The Fire Bowl

TABLE OF CONTENTS—Continued

Water as a Polychrome Ink
Sympathetic Inks
Magic Stars from the Candle
Magic Crystals
Mysto Magic Paper
Is a Glass Ever Full?
The Magically Suspended Ring
Rainbow Flashes
Chemical Flash
Tube Lengths for "Acid Tubes"
Curious Experiment
The Musical Flame
Lighting a Candle Without Touching the Wick
Placing a Glass of Water in Such a Position that No One Can Remove It Without
 Upsetting the Water
The Mysterious Egg
Which Is the Boiled Egg
What a Glassful of Water Will Hold
To Change the Complexion from White to Black
Diabolical Odor
Magic Writing
The Magic of Superficial Tension
The Magic Flags
Magic Sugar
The Camphor Scorpion
Pharaoh's Serpents
The Improvised Horse Chestnut Floating Torch
The Magic Moving Tumbler
Chemical Butterflies
Magic Water
Tantalizing Matches
Trick Matches
The Ice Factory

Gilbert Chemical Magic

INTRODUCTION

The Thing To Do First. We do not ask that you should do at any one performance every one of the tricks which we describe, as it is possible that some of them may not particularly appeal to you. The thing to do is to pick out those which you think are the best and which are suited to your idea of an evening's entertainment. We should certainly recommend that you do each one of the tricks and then pick out those which you think will produce the most fun and amazement.

All Your Tricks Need Not Be Chemical Tricks. We do not recommend that you give an entire performance of just chemical tricks, but pick out one or two of the best and give them in connection with your evening's entertainment with some of the other Gilbert Magic Series.

How to Give a Chemical Magic Entertainment. First, have a table (see Fig. 1) with a depression or shelf in the back where the chemicals can be left open ready for use.

Second, arrange your glasses on the table in advance and have those for each trick in a row, so that you will not get them mixed up when performing; or you can actually mark on the table the name of the trick, the number, and the order in which the glasses are to be used. It is important that the articles required for the performance should be arranged beforehand so that there will be no confusion, otherwise your show will not run smoothly. With a little practice and care you will avoid all cause for trouble.

Third, the method herein described of putting the chemicals into the glasses during the performance, is quite unique and simple. For this purpose, use a little wooden wand with a notch at one end in which the chemicals can be picked up and carried unnoticeably and then dropped into the glass or bottle while you are performing. All conjurers and magicians use a wand, so do not fear that anyone in the audience will become suspicious. By gently tapping the bottle with the wand, using this in a perfectly natural manner, the chemicals will drop without in any way your audience becoming aware of what has taken place.

GROUP I

Opening Your Performance. For your introductory trick in Chemical Magic we would recommend what is known as the "Great Smoke Mystery." This makes a startling opener and you will secure your audience's interest right

from the start and thereby hold their attention. Incidentally, as the nature of the chemicals used in the "Great Smoke Mystery" makes it necessary to perform the trick within a reasonably short time after the preparation has been made, it is well that it should be the first trick on your program.

"Patter" For Opening Your Chemical Magic Performance. It is always pleasing to hear the magician or conjurer make interesting remarks about his work while he is engaged in performing his tricks, and if these remarks happen to be humorous, so much the better for the success of the performance. Pro-

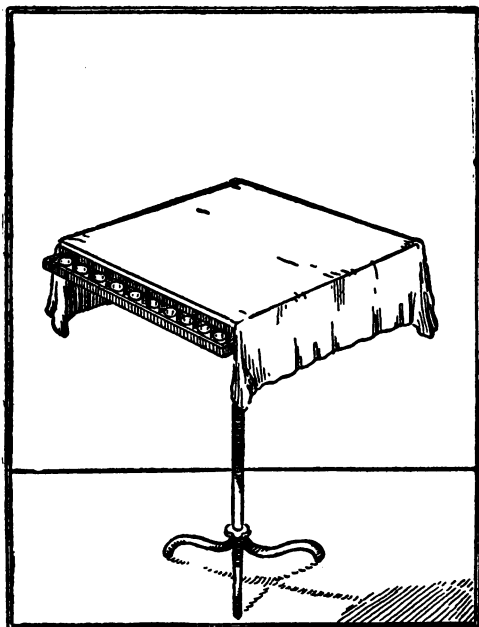


Fig. 1

Professional magicians call these remarks "patter" and so that you may have an idea as to the kind of "patter" best suited to the experiments that follow, we will give you an example with which to commence your show:

"I am going to perform for you tonight a series of experiments in Scientific

Legerdemain. I am going to demonstrate to you that there are around us everywhere natural spirits, and possessing as I do the ability to call upon and make use of these natural spirits, you shall have the pleasure of seeing mysteries of another world.

"It might be of interest to you to know that these spookish beings control the air, the water, and fire and sometimes they actually gain possession of me, when I go into a trance under the spell of their power. It is through their hypnotic influence over me and their assistance that I am able to convey to you these marvelous wonders."

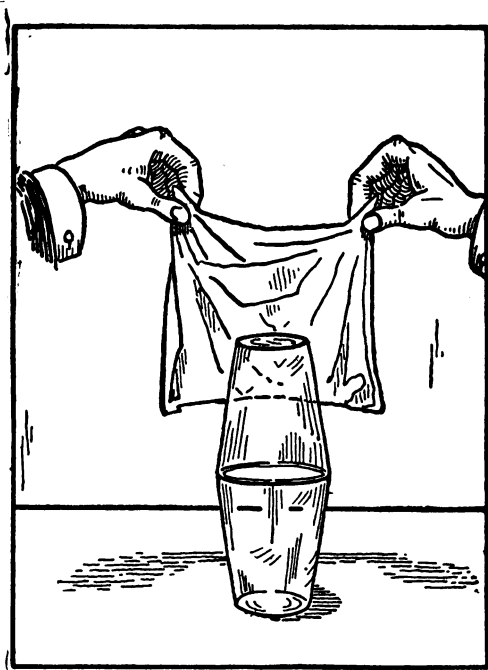


Fig. 2

THE GREAT SMOKE MYSTERY

"I have here two ordinary glasses which are quite empty and unprepared (put the wand inside of each glass, tapping it at the same time). With the

loan of someone's handkerchief (go down into the audience and borrow one), I am going to, by the aid of the spirits, for my first trick tonight, invisibly transfer smoke which I will produce by natural means in one space, to another space in the same room. (The glasses are then placed one on top of the other, mouth to mouth, and covered with the borrowed handkerchief, the paper is lighted and the smoke produced is fanned toward the glasses. While fanning the smoke, you proceed with your patter.)

"I now call upon the spirits, and by their aid the smoke that you see vanishing into the air is actually being transferred into the glasses and is being held there until I remove the handkerchief. (You now proceed to remove the handkerchief

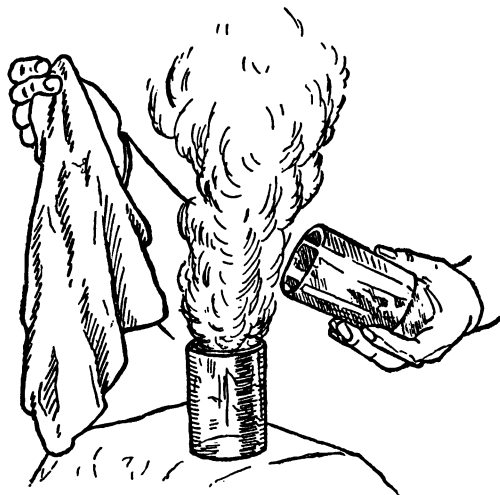


Fig. 3

and the top glass.) The handkerchief has concealed the actual transfer, as you will note that every bit of the smoke has disappeared from the air and is to be found inside the glasses."

Effect. And now, so as to enable you to get a good mental picture of the trick, we will describe its "effect," that is to say, the part which the audience sees of what is going on.

You call your audience's attention to two empty tumblers, with rims of the same size, so that the mouth of one glass may be placed on the other. The

glasses are shown to be empty (which they are as far as the eye can see). You now place them mouth to mouth, and both are then covered with a handkerchief, the borrowed one, if you so desire. (See Fig. 2.)

Now step to one side of the stage or platform and light a brown piece of paper or anything that will make a lot of smoke; then borrow a fan and fan the smoke toward the glasses. This you continue to do for a few minutes; you then reach over, remove the handkerchief, and the tumblers will be found full of smoke. When you take the glasses apart, a great mass of smoke will arise as though it had been held under pressure. (See Fig. 3.)

How It Is Done. Two empty glass tumblers are used for the trick. Into one of the tumblers, put a few drops of muriatic acid and rotate the glass so that the few drops of the acid will spread out thinly over the inside of the tumbler and will become unnoticeable; into the other glass, put a few drops of concentrated liquid ammonia. This glass you likewise whirl around in your hand so that the ammonia will become thoroughly spread.

These glasses must be kept far apart before inverting one over the other, so that there is no opportunity for the fumes to get at one another. The attention of the audience is called to the fact that the glasses are quite empty. You can insert your wand to show that there is nothing concealed inside. Now pick up the handkerchief and at the same time one of the glasses, inverting it on top of the other, then proceed as described above.

Important Notice. There must be no time lost in covering the tumblers with the handkerchief when you bring them together, mouth to mouth, because the chemical action takes place almost immediately and you do not want the audience to discover this, for it will spoil the trick.

What Takes Place. When the glasses come together, the vapor from the two chemicals combine with one another and form ammonium chloride. This is a white fume which the audience takes for the smoke that you have transferred from the smoking paper to the glasses, in a mysterious way.

Note. Muriatic acid is the commercial name given to hydrochloric acid.

CHANGING WATER TO WINE

To do this trick you can work up some good patter about prohibition, telling your audience that it does not affect the magician, as he can change water to wine.

You have ready for this trick a wineglass half full of water. Up to this time of the performance, you have not used your wand. You now pick up the wand,

which has a few crystals of potassium permanganate in the notch, which you placed there before the beginning of the performance. Take an ordinary handkerchief and pass it for examination. We do not recommend borrowing one, for it is apt to get spoiled with some of the chemicals and this would be rather embarrassing. Next, show the glass of water and, after taking a drink from it so that your audience will know it is perfectly all right, cover it with the handkerchief. You now pick up the magic wand, and lifting the corner of the handkerchief, tap the glass with the wand, saying that you will call on the spirits to change the water to wine. You drop the crystals of potassium permanganate which were on the wand into the glass.

Now shake the glass so that the color will spread throughout the water; then lift the handkerchief, affecting a mysterious manner, and show the magic change which has taken place.

What Took Place. Potassium permanganate dissolves readily in water and gives this a reddish tint very much like that of claret wine. Only a very few crystals are needed to color a great deal of water.

CHANGING WINE TO WATER BY PASSING YOUR HAND OVER THE GLASS

This trick may be presented independently of the one preceding as it is in itself an excellent one; however, it will be found that by presenting it as a complement to the "Changing Water to Wine Trick" a very superb effect is obtained.

Effect. Pass your hand slowly over and slightly in front of the glass. Presto! It is water!

"Patter." "Now, ladies and gentlemen, before I prevail further upon the powers that be to assist me in my miraculous changes of matter, I want to have you know that everything you see changed has assumed a new form and is really changed. I do not stoop to substitution by sleight-of-hand. For example, I have here a glass of wine; by passing my hand over it, thus, I change it to water. If you do not believe it is possible, watch closely."

How It Is Worked. Before the performance, fill a small wineglass full of water, colored with a few drops of potassium permanganate solution; then, just before coming on the stage, you drop into the palm of your hand a little peroxide of hydrogen. Peroxide is easily obtainable, being usually kept in every home. You can hold this in your hand while making your opening remarks without attracting any attention. When you say, "By passing my hands over the wine I change it to water," what you do is to drop some of the peroxide from your

palm into the solution, which becomes bleached. This trick, like the others, should be practiced beforehand. You should ascertain exactly how much peroxide will be required to bleach the red solution.

Explanation of What Happened. The hydrogen peroxide oxidized the potassium permanganate forming a new compound. This forming of a new compound is known in chemistry as chemical reaction. The new compound formed is colorless.

TO POUR MILK FROM A MILK BOTTLE FULL OF WATER

"Patter." "With the price of milk soaring the way it is, this necessity will soon become a luxury. However, I am here to free the people by breaking up the Milk Trust. I have the power of taking ordinary water and converting it into milk. Behold! I take this bottle of water, pour its contents into a glass and lo! by my power of mind over water it is converted into milk!"

How It Is Worked. Before you start the performance, drop three "measures" of calcium oxide into a quart milk bottle, half full of water. Shake until the lime is dissolved. Pour the clear liquid into another milk bottle. Into an ordinary wineglass place two measures of sodium carbonate. Dissolve this in two teaspoonfuls of water. You are now ready to do the trick. When lime water is poured into the glass, it makes the solution appear like milk. (One "measure" of a dry chemical is understood to be the portion which will remain on the flat end of a teaspoon after lightly tapping it.)

What Happened. When the lime-water poured into the glass united with the sodium carbonate, a very fine precipitate (calcium carbonate), was formed and this gave the water the appearance of milk.

POUR WINE FROM PITCHER OF WATER, POUR BACK AND IT IS WATER AGAIN

"Patter." "I will now give a more lucid demonstration of the power of mind over matter. Here I have a pitcher of water in one hand. In the other, an empty glass. Will someone step close and examine them? Thank you! Now, ladies and gentlemen, I command this water to change into wine." (Pour solution slowly from the pitcher into the glass, filling the glass about one-half or two-thirds full. This solution becomes red in the glass. After the applause is over, you can further declare), "I can now command this glass of wine to return to its pristine state; by pouring the wine back into the pitcher, lo and behold, the wine is again water!"

How It Is Worked. Secure before the performance a transparent glass pitcher and an ordinary glass. Into the pitcher pour three glassfuls of water. With the water mix ten drops of phenolphthalein. To the phenol solution in the pitcher add one spoonful of acetic acid. Into the glass place five "measures" of sodium carbonate, add about two or three ounces of water (about one-half an ordinary tumbler), and let it dissolve. You are now ready for the performance.

Chemical Explanation. The trick depends upon the fact that phenolphthalein, which is what chemists know as an indicator, turns red in the presence of bases (alkali solution) and colorless in the presence of acids. The solution in the pitcher has been so made up that the acid predominates. In the glass, the opposite is true as here the base supplants the acid; back in the pitcher, again the acid supplants the base; in other words, there is more acid than alkali.

TURNING IRON INTO COPPER

This is not a very elaborate stage trick, but you might have some fun showing your friends sometimes that you can turn iron into copper.

You take a glass one-third full of water and place into it five "measures" of copper sulphate. Stir the solution, letting the copper sulphate dissolve, and the water will become blue. Take a knife blade that is bright and clean—an ordinary pocket knife will do. Dip the blade into the solution, hold it there for a few seconds and take it out. The part of the blade that has been immersed in the solution will look just like copper. Any bright piece of iron will turn into copper when this is done, but be sure that the iron is clean or the result will not be satisfactory.

What Took Place. Copper sulphate dissolved in water is known as copper sulphate solution. The copper is invisible owing to the state which it is in. When iron is placed in the copper sulphate solution, the copper in the solution deposits itself on the iron, and appears as though iron has been changed to copper, but you will find that you can rub the copper off the blade quite easily. The explanation is that an acid will dissolve iron more readily than it will copper. When in the acid solution there happens to be copper (like in our solution of copper sulphate), the iron being more easily dissolved displaces the copper and this is deposited in metallic form on the iron.

INK TO WATER

This is probably one of the most famous and oldest of conjuring tricks. It was worked successfully by Herman the Great, and was done by other great magicians before and after him. It can be performed with many variations,

certain suggestions as to these we make here. It will certainly be a pleasing part of any magical performance. It is a trick easy to perform without detection, requires no sleight-of-hand and is very unexplainable.

Effect. The effect of the trick is as follows: Have two glasses, one filled with water and one with ink (apparently). To prove it is real water, you take a drink of it and to prove that it is real ink you dip a card into the glass and pull it out showing it to have been blackened. Next, you borrow two handkerchiefs or use two of your own. Cover one of the glasses with one of the handkerchiefs and the other glass with the second handkerchief. Take your wand and perform the magic pass saying the words, "Mysto Magic." On removing the handkerchiefs, the water is seen to have been changed to ink, and in the glass with the ink, to the surprise of everyone, will be seen water in which a goldfish is seen swimming.

The Secret. The explanation, although by no means obvious, is extremely simple. Two tumblers are each half filled with water. In one of the tumblers you insert an accessory made of a piece of black cloth sewed around a wire ring which will fit the inside diameter of the tumbler at say, two-thirds from the bottom. This accessory looks not unlike a jelly bag, but it is open at the bottom. (See Fig. 4.) This sort of bottomless bag is forced down into the water so that it will cling snugly to the inside of the tumbler and then water is added so as to bring its surface up to a point level with the ring or upper part of the black bag. A few feet away, the glass will look like two-thirds filled with black ink. Inside the glass a small goldfish may now be placed with perfect safety. In removing the handkerchief from the glass of ink, all you have to do is to catch the ring with the finger (to facilitate the lifting of this accessory from the tumbler, a bail made of fine white metal wire may be attached to the ring as shown in the illustration), bringing away the accessory under cover of the handkerchief, when will be revealed the clear water with the goldfish swimming about in it. Lay aside the handkerchief leaving the black bag concealed under its fold, or you can dispose of it by letting it drop unobserved on the secret shelf behind your table or in any other convenient manner.

Naturally you will ask, how about the dipping of the card and bringing it out blackened? This likewise is very simple. Blacken half of one side of a card and have it thrown carelessly on the table. When you pick it up, be careful to show only the white side to the audience. When you put it into the glass, you turn the card around, and when you take it out, show the blackened side. It appears then to have been stained with ink.

Now for the other glass where the water is turned into ink. You place the handkerchief over that glass of water, dropping into it at the same time an ink

lozenge. The ink lozenge is something you can make up yourself very easily by taking some ordinary baking soda, which is a mixture of bicarbonate of soda, and tartaric acid. Two parts of tartaric acid and one part of bicarbonate of soda are mixed, and to this sufficient nigrosine solution (aniline dye) is added to color it. Nigrosine solution is prepared by dissolving three "measures" of nigrosine in one tablespoonful of water. After thoroughly mixing, the compound is forced with a piece of wood through a small short tube, and the formed mixture as it comes out at the other end is cut into small disks, which are set aside to dry.

What You Do. You drop this lozenge into the glass of water when you cover it over with the handkerchief. You will find that almost instantaneously it colors the water. Bicarbonate of soda is used because it is effervescent and makes the color change very quickly. The coloring is done, of course, by the aniline dye.

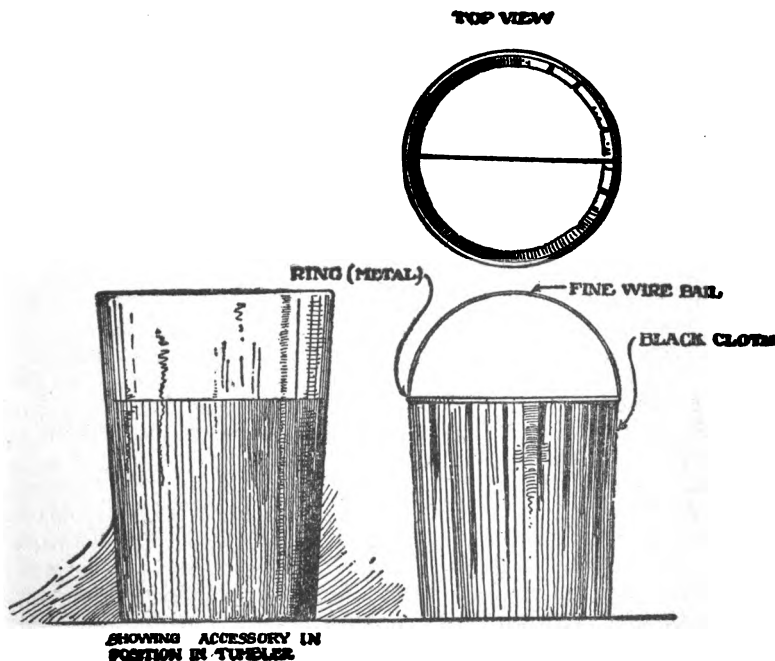


Fig. 4

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This is a dandy trick and by all means should be included in your performance, as it will always be well received and bring good applause. It is worth while to go to the trouble of securing a little goldfish, as the appearance of this will make the trick far more effective.

WATER TO INK

This trick, although not nearly as spectacular as the preceding one, is an interesting and simple change. Be sure to try it out, for it is really worth while.

Two small glasses are necessary; one glass, one-third full of water to which is added one "measure" of tannic acid and then stirred; the other glass, also, one-third full of water, to which is added one "measure" of ferric sulphate (iron sulphate), then stirred. This preparation, of course, should take place before the trick is to be shown. These glasses are now displayed to the audience as containing ordinary water. You now say the magic words "Mysto Magic" and wave your wand about them and command the water to become ink, at the same time picking up one glass and pouring it into the other.

What Happened. Tannic acid solution added to ferric sulphate solution makes black ink, which is nothing more or less than iron tannate. You can make your own ink in this way, if you wish: In a small bottle half full of water put one "measure" of tannic acid and one "measure" of ferric sulphate. Cork the bottle and shake it well. If the solution is not black enough, add another "measure" of each of the two chemicals.

SECOND SIGHT

This is without doubt the most amazing trick of all. It has been worked by almost every celebrated medium on the face of the earth. It has been used by many of the most noted Second Sight workers, conjurers and magicians. I recommend that this be one of the last tricks in your performance, because it will surely amaze and mystify your audience. Of course, you will have to practice it so you will be sure of yourself. The only difficulty is that you need an assistant, but this is of a minor nature as you can easily arrange with some one of your friends to help you.

Commence by saying: "In my next number I will give you a demonstration of my most noteworthy gift. If someone will be kind enough to write a question on this card, then seal it in this envelope, I will answer the question by merely inserting a slip of paper into my magic bowl. Ah, thank you! Yes, I don't mind answering several questions. Just drop the envelopes into this hat. All in? Thank you! Now, ladies and gentlemen, we will drop the envelopes upon the table where they will remain in your full view. But before going

any further, I must tell you a funny story that just occurred to me (tell some humorous joke). Now to proceed. (To assistant), my hat, please. You see, I put the envelopes into the hat. I put these papers into the hat. Presto! From the hat I put each paper into the bowl and behold, the questions appear upon the blank paper!"

How It Worked. For your preparation you need a thimble full of strong ammonia; the same amount of denatured alcohol (plain alcohol will do), some weak copper sulphate solution, a derby hat, a quart mason jar or a milk bottle or some kind of large-mouthed glass jar, several envelopes and cards to fit them, several strips of white paper, and last, but not least, an assistant.

Several people in the audience are requested to write upon the cards, insert them in the envelopes, seal these, then drop them into the hat. The envelopes are secretly slipped under the hat band, and another lot of envelopes sealed to resemble the lot which the audience will later drop into the hat, which has been previously concealed under the band, is now dumped upon the table. As the audience is not aware of the substitution, there will be, so far, no suspicion of trickery. This substitution can most conveniently be made by the assistant at the time he goes with the hat towards the table. It can best be done then with full assurance that detection will be avoided, as your assistant is with his back to the spectators and the attention of these is being held by your remarks, away, momentarily at least, from him. The assistant, who carried the hat off stage or to the next room, carrying with him, of course, the envelopes dropped by the audience and which he slipped under the band, now rubs a bit of alcohol over each envelope. This makes the paper transparent. He notes the question and answers it upon a strip of white paper. The writing is done with a fine brush dipped in the weak copper sulphate solution. Meanwhile, you are telling the story. When the assistant has finished, he puts the envelopes (now dry, for, as the alcohol evaporates, there will be no trace of their ever having been wet), and the answers, into the hat. He hands it to you. You pick from the table the substitute envelopes and the strips of paper, placing them under the hat band. You then take out the real envelopes and strips with the answers. The answers are invisible. Insert the strips of paper into the covered jar, which contains a small quantity of strong ammonia. The answers appear, as if by magic, in blue writing. You may pass back the original envelopes to show that the flaps have not been tampered with.

Chemical Explanation. The ammonia vapor acts on the tiny copper sulphate crystals present in the invisible writing giving these a bright blue color. This solution is one of the best kind of so called sympathetic inks.

MAGIC WRITING INK. IT APPEARS AND DISAPPEARS AT YOUR WILL

Disappearing ink has been known for hundreds of years. It has been used in secret letter-writing, spiritualistic tricks, and secret messages of all kinds. For instance, you can send out an ordinary typewritten letter touching upon a commonplace subject and between the typewritten lines you can write out the secret message with invisible ink and the person for whom the message is intended and who is in on the secret will be able to read it, while no one else can. This scheme has been used during the war in secret service work. It is very interesting to know about it.

How to Proceed to Do It. Make a weak solution of cobalt chloride, then take a pointed piece of wood or a pencil, dip this in the solution and write on a piece of paper. Let it dry, and if properly done, the writing will be invisible, but as soon as held over heat it will turn blue.

What Takes Place. Cobalt chloride, when dry, is blue, but it absorbs moisture readily and when this happens it turns light pink. The tiny crystals in the writing done with the weak solution, while moist, were of a very light pink color, and being so small, were practically invisible. When heated, the moisture is driven off, and the beautiful cobalt blue color returned.

Another amazing thing about the trick is that you can make the writing disappear again by blowing gently on the paper. The crystals of the cobalt chloride absorb the moisture of your breath and the writing disappears.

CHANGING BURGUNDY INTO SHERRY

In a half wineglass of water make a pink solution of potassium permanganate. This will serve as a good imitation of Burgundy wine. You may exhibit this to your audience describing what it is and telling them that by pronouncing the mystic words "Mysto Magic," you are going to change Burgundy to Sherry.

You now take the magic wand, and put in the notch a "measure" of tannic acid and while covering the glass with the handkerchief you secretly drop the tannic acid in. You can raise the handkerchief up and tap the glass with the wand while doing so. The solution turns from red to a brownish color which to the audience will appear as Sherry wine.

What Took Place. The tannic acid reacts on the potassium permanganate and discolors it.

EXTRAORDINARY WINE, WATER AND MILK TRICK

You will find this one of the most effective and spectacular of all chemical and conjuring tricks.

Effect. You appear before your audience with a tray containing six empty glasses and a pitcher filled with water.

You take the pitcher from the tray and pour water into the first glass, wine into the second, water in the third, wine in the fourth, water in the fifth and wine in the sixth. Now the contents of all six glasses are poured back into the pitcher. You then take the pitcher again, pouring wine into the first five glasses and water into the sixth. Then the six glasses of liquid are all again poured back into the pitcher, and to the astonishment of the audience, when the contents are again poured into the first five glasses, they are all water. Then the performer states that into the remaining glass he can pour any beverage he desires from the pitcher. When someone calls out for milk, he pours milk from the pitcher into the sixth glass.

Preparation for the Trick. We recommend in doing this trick that you use a tray so that the glasses can be prepared by an assistant on the side or prior to the performance so as to avoid mixing them with other glasses that are on the table. In fact, at this time we might state that where you use a group of glasses for certain tricks, they should be prepared on a tray and have ready on one side of the stage or platform. After doing the trick, it would be perfectly natural to hand the tray to the assistant suggesting that he wash the glasses in preparation of the next trick. In this way he goes off the stage and brings back another tray of glasses properly arranged and thereby avoids confusing the various combinations you have prepared. The second advantage is that an assistant can easily prepare these glasses off the stage or in a secret part of the room so they will be ready for each trick or, if the assistant is not available, you can arrange these trays yourself and have them off stage and simply walk off and bring them on. For the feature trick, which is the one we are about to describe, you can arrange the glasses on the tray as follows:

You require eight glasses. Six of the glasses are arranged in the front of the tray in a semi-circle. We will number these glasses from one to six. In back of these glasses place glasses No. 7 and No. 8, and behind all of the glasses place the pitcher. Prepare the glasses before the performance. We would recommend the use of a medicine dropper in putting the chemicals into the glasses, having a separate dropper for each chemical.

Glass No. 1 is unprepared.

Glass No. 2 contains 3 drops of a saturated solution of sodium carbonate.

Glass No. 3 is unprepared.

Glass No. 4 contains 3 drops of a saturated solution of sodium carbonate.

Glass No. 5 is unprepared.

Glass No. 6 contains 3 drops of a saturated solution of sodium carbonate.

Glass No. 7 contains 12 drops of a saturated solution of tartaric acid.

Glass No. 8 contains a full $\frac{3}{4}$ teaspoonful of tincture of benzoin.

The pitcher is prepared by putting in six glasses of water adding 20 drops of a 5 per cent solution of phenolphthalein.

Caution. When pouring the liquid from the pitcher do not fill the glasses to the top; better about three-quarters full.

After making your opening remarks regarding this excellent trick, you step forward, stating to your audience that you have a few entirely empty glasses into which you will pour from the pitcher almost anything they may desire. You follow this statement by pouring water into the first glass, wine into the second, water into the third, and so on alternately. Now you casually and carelessly pour the glasses of wine and the glasses of water back into the pitcher, when the mixture will appear to be all wine, but be sure and place the last glass emptied behind all the other glasses on the tray. You now repeat the experiment filling the five glasses with wine; then pick up the glass No. 7 (the audience being under the impression that you are picking up glass No. 6), and fill from the pitcher, when the wine poured into the glass becomes water. This is very effective and startling. The audience had taken for granted that when the wine and water were mixed in the pitcher the mixture would take the appearance of wine, and they were on the point of remarking that the trick is very simple; and it naturally was a great surprise to them to see you fill the last glass with water from the wine in the pitcher. But, this is not all. Again all six glasses of liquid are poured back into the pitcher.

Important Notice. Begin with the glass of water and pour the contents of each of the glasses back into the pitcher. When you have the last or sixth glass emptied, place it behind all the glasses as before. After a few remarks about how well the experiment is going, you again pour from the pitcher filling five of the glasses with water, much to the astonishment of the audience. You then pick up glass No. 8, which has been prepared with tincture of benzoin, and this is the real climax to the trick. Before the entertainment you should select a confederate who should, when you ask what they desire you to pour into the last glass, call for "milk." There are, of course, many other ways well known to professional magicians for forcing a name upon the audience.

The result, however, is this. You now pick up glass No. 8 and make the

bold statement that you can pour almost anything you desire from the pitcher and that if someone in the audience will call out a drink you will pour it for them. Your confederate calls "milk" and immediately you pour milk into the last glass. This makes a grand finale to the trick.

Note. The more tincture of benzoin used, the more perfect will be the illusion as far as its looking like genuine milk.

Chemical Explanation. The chemical explanation given in connection with the trick "Pour Wine From a Pitcher of Water, etc." applies also in this one. The only other point to make clear is that in pouring a portion of the solution in glass No. 8, containing the tincture of benzoin, an emulsifying action takes place which gives the liquid the appearance of milk.

MYSTERIOUS GLASSES

Effect. The performer appears before the audience with a tray containing five glasses and a pitcher of water.

Into the first glass is poured ordinary water; into the second glass is poured claret. This is then poured into the next glass and it mysteriously changes into a brandy tint, and it is then poured into the next glass and it changes back to the claret and when poured into the last glass it will turn into almost black which may be called ink or any liquid which may suit the fancy of the performer.

How the Trick is Worked. It is well to have these glasses prepared on a tray as we have described in some of the other tricks so that when you come forward to the audience you will be all prepared for the experiment or trick.

The glasses are prepared as follows: Glass No. 1 is unprepared; into glass No. 2, place a little fine ground and sifted red sanders; glass No. 3 is rinsed with ordinary vinegar; into glass No. 4, six "measures" of sodium carbonate are placed; into glass No. 5, a little powdered alum. Upon pouring the water into the first glass, you discard the pitcher and pour the liquid from the glass No. 1 into glass No. 2, and the liquid takes the appearance of claret; upon pouring this in glass No. 3 the second change takes place; on turning the contents of glass No. 3 into glass No. 4 the color changes back to the first; and the last change is made when pouring No. 4 into No. 5 when the liquid becomes quite black.

Chemical Explanation. The acetic acid contained in the vinegar with which glass No. 3 is rinsed, reacts on the pigment and discolors it. The sodium carbonate, which is a base, gives the pigment back its reddish color, and upon the powdered alum being brought into the solution, a reaction takes place which gives this liquid a dark tint, similar in appearance to black ink.

MYSTERIOUS JUG OF WATER

Effect. You exhibit on a tray three glasses. Step forward to the audience and introduce to them a little jug of yours that you carry around as it has proven very effective in producing some very startling experiments in magic, possessing the property of producing practically anything in the form of a drink that you may desire. You then proceed to pour from the jug into one of the glasses some of the contents, which will appear purple in the first glass; in the second glass it will be green and in the third it will be red.

The trick is an extremely pretty one and is particularly effective because the liquid is all poured from one container into three glasses which appear unprepared and empty.

How the Trick is Worked. You make a solution by boiling some red cabbage leaves for half an hour. This makes a purple solution. Before using, it must be cooled off and then you are ready to proceed with the trick. The tumblers are prepared as follows, although the audience is not aware of the fact:

Glass No. 1 is unprepared.

Glass No. 2 contains 4 drops of ammonia.

Glass No. 3 contains 4 drops of tartaric acid.

Now you proceed by pouring from the jug into glass No. 1, 2 and 3 when the above effect will be observed. This is a very effective little trick.

Chemical Explanation. The decoction of red cabbage leaves is a chemical indicator which in combining with acids and bases produces results similar to those of phenolphthalein, explained elsewhere in the foregoing pages.

THE FLAGS OF VICTORY

Fluid colored changes are always very pleasing to the eye, and if presented with the right sort of "patter" they will fit very well indeed in a program of magic. The changes suggested in the following lines are so combined that they will reproduce the national colors of several allied nations in the great war. By making a few brief allusions to the heroic part each nation took, as the respective colors of each are produced, a patriotic note will be sounded which will find ready response in the average audience.

Effect. In each of three glasses half full of water, the magician pours some water from a pitcher, with the result that the water in the glasses will turn black in the first, yellow in the second, and red in the third. These three colors, he announces, are those of the Belgian flag, and adds that in this experiment they

represent the heroic little nation at the beginning of the war. Then follows another change of colors obtained as at first by pouring water from a pitcher into each of three glasses, apparently half full of water. The colors this time are blue, yellow and red, which combination, he says, represents Roumania, the other allied nation which suffered very much the same fate as Belgium. He remarks that he could continue producing color changes to represent each one of the nations engaged in the war, but states further that for his purpose it will suffice to represent the two nations which it is the consensus of opinion suffered the greatest privations.

The three glasses with the colored liquids representing Belgium he places on one side of the table; the other three glasses, those representing Roumania, on the opposite side. He reminds the audience that after the crushing of Belgium and Roumania, despair reigned in the allied camps, but that hope rose high and victory for all seemed certain when the great nation across the sea cast its lot with the Allies and its battalions of gallant youths marched from victory to victory, lifting on high Old Glory, the glorious oriflamme, the imperishable red, white and blue. At the same time he pours water from a pitcher into each of a third set of glasses, the colors this time being red, white, and blue.

Secret. The first set of three glasses is prepared in the following manner: Fill each about half full of water, and in the first dissolve one "measure" of tannic acid. Dissolve three "measures" of sodium bisulphite in the second and two "measures" of sodium sulphocyanate in the third. In a transparent glass pitcher dissolve fifteen "measures" of ferric ammonium sulphate in three glassfuls of water, and upon pouring some of this solution into each of the three glasses in this set, the solution in the first glass will turn black, the one in the second will turn yellow, and the one in the third will take on a beautiful red tint.

In the second set of three glasses, each half full of water, dissolve the following chemicals: One-quarter "measure" of sodium ferrocyanide in the first; three "measures" of sodium bisulphite in the second, and two "measures" of sodium sulphocyanate in the third. Upon pouring some of the ferric ammonium sulphate solution in the pitcher, the combination of this solution with those contained in the set of three glasses will produce colors as follows: blue in the first glass, yellow in the second, and red in the third.

The third set of three glasses is prepared as follows: Fill each two-thirds full of water, dissolving in the first glass two "measures" of sodium sulphocyanate; three "measures" of barium chloride in the second, and one-quarter "measure" of sodium ferrocyanide in the third glass. By pouring a portion of the ferric ammonium solution in each one of the three glasses, the liquid will turn red, white, and blue in the first, second, and third glasses, respectively.

Chemical Explanation. The *black* color is due to the formation of a black precipitate of iron tannate by the action of ferric ammonium sulphate upon tannic acid.

The *yellow* color is formed by the partial hydrolysis of ferric ammonium sulphate in the presence of sodium bisulphite with the formation of ferric hydroxide.

The *red* color is due to the formation of ferric sulphocyanate by the action of ferric ammonium sulphate upon sodium sulphocyanate.

The *blue* color is due to the formation of "Prussian Blue" or ferric ferrocyanide by the action of ferric ammonium sulphate upon sodium ferrocyanide.

The *white* color is due to the formation of a white precipitate of barium sulphate by the action of ferric ammonium sulphate upon barium chloride.

GROUP II

SPECIAL TRICKS

The following are not, strictly speaking, chemical tricks, but they all may be worked nicely in conjunction with the tricks described in the foregoing pages.

FIAT LUX (LET THERE BE LIGHT!)

A very superb effect may be obtained by those willing to go to the work and expense which the careful preparation for this trick entails.

Effect. The magician, upon making his appearance, perceives that several candles located at different places on tables on the stage, are not lighted, due to the forgetfulness of his assistant, as he apologetically remarks. Nonchalantly he

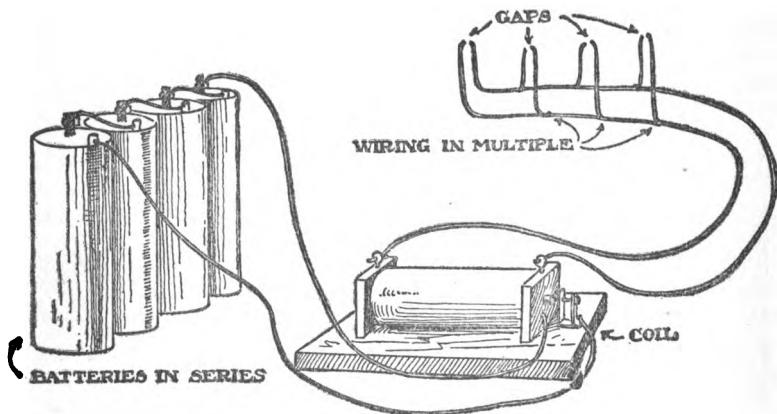


Fig. 5

adds that in this very fault of his assistant he is able to see some good, frankly stating that, in fact, good may be found everywhere if we only know how to look for it, as witness the oft repeated saying: "Every dark cloud has its silver lining." For does not the forgetfulness of his assistant give him an excellent opportunity to bring into action forthwith his magic powers in such a convincing manner as to completely set at rest, right at the start, the doubts of the skeptical? He waves his wand in the direction of the candles and these are seen to become lighted in a most bewildering manner, as though invisible hands had simultaneously set matches to them.

Preparation. This spectacular result is obtained by preparing each candle in the following manner: A long hatpin, or a pointed piece of straight, stout wire is heated and it is then run through the length of the candle making a hole which goes clear through from the bottom to the upper end. The hole is to be made near the wick and it is recommended that the candle be left lighted for a few minutes before making this hole, so that the upper end may become flat and the wick somewhat charred. The hole through each candle serves to conceal a fine wire which connects the candles, in multiple or parallel wiring, with a Ruhmkorff induction coil through which the current from an electric battery composed of say, four dry cells, is passed. (See Fig. 5). The electric wire is run

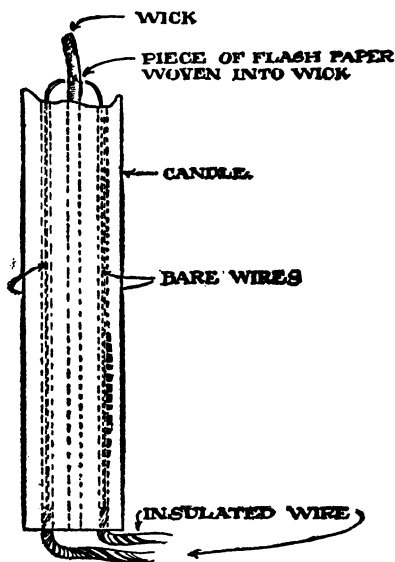


Fig. 6

double through the hole and is divided near each wick so that when the current is turned on (or the circuit is made), a tiny spark will be produced which will jump from one point of the wire to the other at each wick. The points of the wires must not touch each other but should be close enough as to insure the jump of the current from one point to the other which would not happen were we to have too wide a gap between points. Between these points, a tiny roll of "flash

paper" (read description of "flash paper" in Group III, page 41), is woven in the wick, which will be set on fire at a time when the electric spark occurs, and from the paper the wick will catch fire and the candle become lighted. To insure good results, it is advisable to moisten the wick slightly with turpentine (a drop or two will suffice).

Even better results will be obtained by piercing two holes in each candle instead of one (see Fig. 6), as in this way, the possibility of having a "short circuit" is eliminated. This method is recommended to beginners.

The wiring has to be done carefully so as to insure the production of a tiny spark at each wick at the time the current is turned on by the assistant

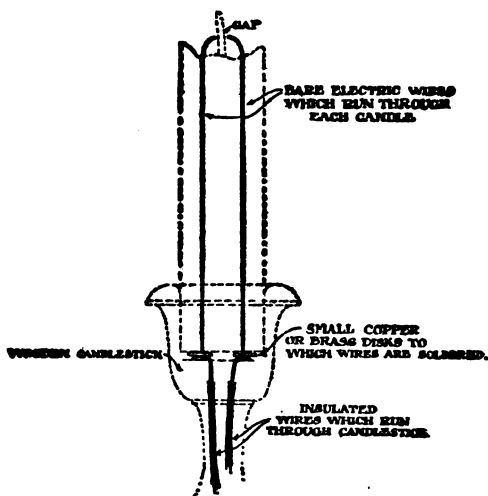


Fig. 7

concealed behind the wings of the stage, or screen if working in a room. There are various clever ways of concealing the wire, using rugs on the floor, where the wires pass, and running them up a hollow leg on the table, etc.

Breaks in the wiring are often introduced but, of course, it then becomes necessary to make the right sort of provision, not only to insure the passage of the electric current, but to mask the fact that such a connection exists.

It will be seen that, by ending each wire at the bottom of each candle on a flat copper or brass disk to which the wire is securely soldered, and by having the wires, which run through the candlestick, secured to the inside of the socket

properly insulated, in setting the candle in the socket, the disk will come in contact with the wires and a circuit will be established which will be practically as good as though the wire were continuous. (See Fig. 7).

By letting melted parafine run through the holes in the candle, after the wires are run through, they will be held permanently in place, and, by cutting them at the upper end as required as the candle shortens, they will always remain concealed.

If by introducing breaks with the appropriate sort of contact plates or points, the magician may not only lift the candles (or at least one) from the candlestick or candelabra, but this also may be picked up and carried about and even the table removed, the absence of wiring will then be apparently proven, eliminating the possibility of the use of electricity, which will naturally heighten the effect of the trick from a magic standpoint.

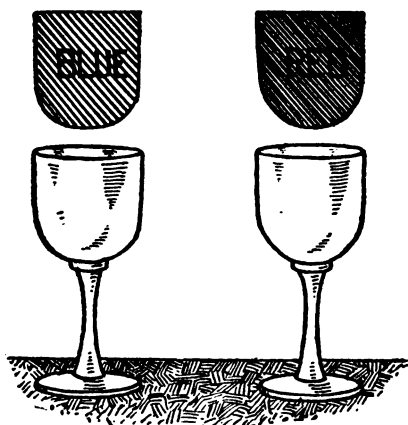
This trick in effect is as much an electrical as a chemical one, and for this reason it is recommended that you acquaint yourself with its electrical side, as we know you will find it very interesting. We advise that you procure a Gilbert Book of Instruction on Elementary Electricity, or, better still, that you get one of the several Gilbert Electric Sets, as you will not only find included in them the book we here recommend and which will tell you all about electrical wiring and induction coils, but also a number of electrical accessories, the use of which will assist you in acquiring in a very interesting and entertaining manner, a very good understanding of the science of electricity.

PROHIBITION VS. WINES

Take two ordinary wineglasses and get two pieces of transparent celluloid, one red and the other blue. (See Fig. 8.) These are cut to fit the inside of the glass while in a vertical position and the glasses are then filled with water. The flat side of the celluloid disks face the audience, giving to the water the appearance of colored liquids to which you give the names of any wine you choose. Now cover each one of the glasses with a handkerchief and when this is removed, you also pick up the disk. The wine then will appear to have been changed to water.

Or, you can use one glass and two transparent celluloid disks and state that you are going to change one kind of wine into another, and when you have done so, change it into water. When you remove the last disk, drink of the water to allay the suspicions of those who may know something about the use of chemicals.

Some very nice "patter" can be worked up in conjunction with this trick. You can tell your audience that you do not drink port, as it is too heavy, but being a magician, that does not make any difference to you, because by throwing

**Fig. 8**

the handkerchief over the glass of port and waving your wand you change it to sherry. But, as nowadays sherry is considered too strong and prohibition is so popular, that you are going to throw the handkerchief over it again and turn it into water, which you prove to be real by drinking it.

CHANGING WINE TO WATER

As a matter of information, we are giving you a secret to a trick that you will oftentimes see on the stage, but we do not recommend it because oxalic acid is used, which is a deadly poison. However, a story of Chemical Magic would not be complete without a description of this trick because you might want to know how it is done when you see it performed on the stage.

The trick is so well described by Professor Hoffman in his excellent book "More Magic," that we are reprinting it here as he gives it.

"The performer shows a row of apparently empty wineglasses, and a jug of water. He pours water from the pitcher into one of the glasses and back again, just to prove that it is water; after which he announces that the jug will, at his command, yield either wine or water. Accordingly, he fills the first glass. The liquid is clear water. He fills the second with apparently red wine. The third glass poured out is water, the fourth wine. He cannot fill the fifth, for the

jug is empty. He, therefore, pours all back again and again fills the four glasses. All now appear to hold wine, though a little diluted. He turns the jug upside down to show that it is again empty, then once more pours the contents of the four glasses back into it. On again filling the glasses, each holds nothing but clear water. Again he returns the liquid to the jug; then takes up and fills from it the fifth glass, which has not yet been used. The liquid is red wine. He empties half of this into another glass and fills both up. Both now apparently contain wine. Back the liquid goes for the last time into the jug. On being again poured forth, it is once more water.

"The various changes are so numerous and so apparently causeless, that even those who suspect chemical agency, and have some knowledge of the science may well be puzzled to know how they are produced.

"The first step is to make a saturated solution of tannin. This is done by simply dissolving tannin in water, until it will take up no more. A half pint may be made at a time and bottled for future use. The next step is to knead powdered oxalic acid with a few drops of water into a stiff paste, and from it make a few lozenge-shaped wafers about the diameter of a dime and almost a quarter of an inch thick. These are allowed to dry, when they become hard like ordinary lozenges. The performer must also supply himself with a small bottle of saturated solution of perchloride of iron, frequently sold under the name of "steel drops."

"These are preliminary preparations. When the performer desires to show the trick, he must make the following arrangements. In the jug (which should be of corresponding size) he must place four wineglassfuls of water to which he has added a tablespoonful of the tannin solution. This does not affect the color of the water. Two of the glasses are prepared by dropping into each two drops of the perchloride of iron. These are placed alternately with two clean glasses in the following order: clean, iron, clean, iron, and the series is completed by a fifth glass into which half a teaspoonful of liquid ammonia has been poured. This is colorless and the glasses all, therefore, appear empty.

"The performer first pours into a clean glass and the color of the solution naturally remains unaltered. He next pours into one of the prepared glasses, when the iron combining with the tannin, produces a beautiful red color. As the change is not absolutely instantaneous, it is well to screen the bowl of the glass with the hand while pouring, thereby giving time for the reagents to combine. If the audience see the liquid change color in the glass, they will at once infer that the trick is chemical.

"Proceed in a like manner with the next two glasses. When the contents of the four are again poured back into the jug, they all amalgamate and, therefore, become red. Now comes in a little piece of sleight-of-hand. When the

performer has again emptied the jug into the glasses, in showing the former empty, he takes the opportunity to introduce one of the oxalic acid lozenges. (These should be in a convenient pocket.) If possible, the lozenge should be broken in small pieces before putting into the jug, because this will make it dissolve more readily.

"When he again pours the liquid into the jug, the oxalic acid, now dissolved therein, again bleaches the solution. But, when a small portion of this bleached solution is poured into the glass containing the ammonia, the alkali overpowers the acid and again brings back the color. When, however, this small portion is again returned to the stock, the acid being in larger quantity overpowers the alkali and again bleaches the mixture.

"It is hardly necessary to remark that oxalic acid is a deadly poison and the amalgamated liquid should, therefore, be gotten rid of as soon as the trick is completed."

LATEST FLYING GLASS OF WATER

We want to describe one other trick that is performed quite often on the stage and, although it is not a chemical trick, it fits nicely into Gilbert Chemical Magic because so many glasses are used that this little side play sometime during the performance may help mystify and increase the effectiveness of the entertainment. I know you would like to know how the Flying Glass of Water is worked, even if it is somewhat difficult to do. It sounds more difficult than it really is, however, for after some practice and with self-confidence the trick can easily be done. Certain changes can be made in the trick after you have become adept, so that it may fit into your performance to suit your own fancy.

The properties necessary for this trick are:

1st. A glass, the upper edge of which has been ground perfectly flat. This you can have done at a glass grinder's or a jeweller's. 2nd. A piece of celluloid one-eighth inch thick that fits snugly onto the mouth of the glass, and, better still, a second piece of celluloid that will fit just inside of the mouth of the glass, cemented to the large piece. By moistening the ground lip of the glass before covering this with the celluloid disk, it will be noticed that it makes a very effective cover which cannot be dislodged very easily and which will keep the contents of the glass from spilling. I have seen some performers use an ordinary piece of thin glass cut into a disk, which will answer the same purpose, although it has to be handled a little more carefully, because it makes a ringing noise when you are doing the trick, unless you are careful. 3rd. Prepare a handkerchief which has a ring or circular piece of cardboard sewed in the center. The ring or cardboard must be the same size as the mouth of the glass. An easy way is to sew two

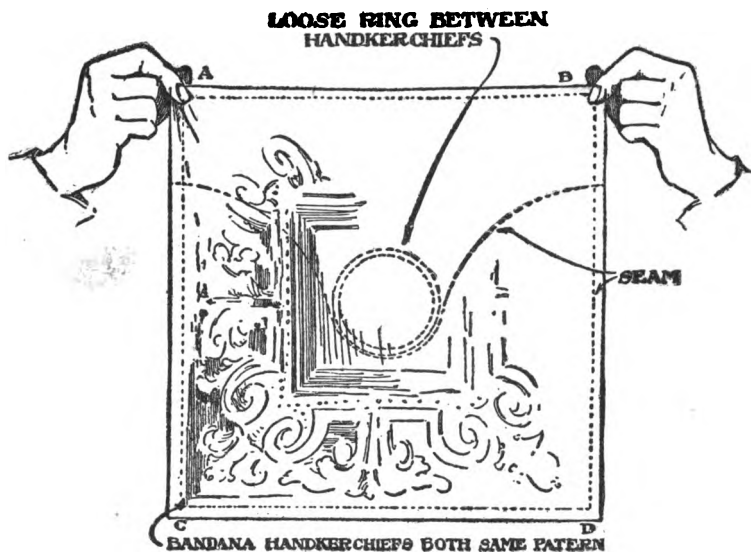


Fig. 9

thin handkerchiefs together around the edges, running a curved seam as shown in Fig. 9, so that when the double handkerchief (appears as a single one to the spectators), is held by corners *a, b*, the loose ring will roll towards the center. When the handkerchief is held by the corners *c, d*, the ring will ensconce itself in either corner *a* or *b* and the handkerchief can then be proven to be as free from preparation as its innocent appearance would indicate. A simpler and also effective way is to sew a patch cut from a similar handkerchief on the center of a bandana, or handkerchief with a colored pattern, to hold in position the ring or disk which will not be noticed, if done neatly. 4th. A small sponge soaked in water.

Introducing the trick, the performer enters with the glass which he fills with water in the presence of the audience. The glass is then covered with the prepared handkerchief in such a way that the ring rests directly over the mouth of the glass. The performer secretly obtains possession of the celluloid disk or glass top, which he had concealed in his vest pocket and, in arranging the handkerchief over the glass, places it on the top of the glass in the proper position. This may sound difficult to you, but the handkerchief is large and in holding it

up in front of the glass you can do a lot of things behind it while you are arranging it. There is no reason for the audience to guess what you are doing, so do not worry, but have self-confidence and keep your mind on the trick you are doing, not on what the other fellow is thinking about.

You now lift the corner of the handkerchief slightly to show your audience that the glass of water is still there. This is to allay any suspicion that you have done anything queer, which might have been discovered owing to clumsiness in getting the celluloid top on the glass. In showing the glass of water under the handkerchief, walk towards the front of the stage.

Having demonstrated to your audience that the glass is still there, return to your table in the back of the room or stage. On the way to the table you adroitly remove the glass from under the handkerchief and place it in the inside pocket of your coat which you have prepared for the trick. This pocket is sewed inside of the coat with a wire or celluloid loop, to keep it open, large enough so that you can drop the glass into it quickly and unnoticed. It is arranged, especially, for the purpose of carrying and concealing articles and is quite necessary in every magic performance. For a better description of the pocket you can read any first-class book on conjuring, which can be obtained in your own Public Library. It is hardly necessary to say that you will have to use great care in removing the glass so that suspicion will not be aroused. The elbows must be held against your sides and not moved up, when walking to the table. With a little practice and patience you will soon be able to drop the glass into the pocket without making any unnecessary moves and no one will ever suspect what you have done.

When you get back to the table, you secretly get possession of the soaked sponge and hold it in the disengaged hand. Again you apparently demonstrate that the glass of water is still under the handkerchief, as by squeezing the soaked sponge, it will appear as though you are spilling water out of the glass. The cardboard disk in the handkerchief is held between the thumb and first finger and the audience thinks the glass is still there, as having no knowledge whatever of the cardboard disk they cannot quite conceive how you could make the handkerchief look as though the glass were under it unless it really was so.

Next, you seize the handkerchief, which during all this time is held by the ring or cardboard, and throw it up into the air and simply shake it out and the glass of water seems to have mysteriously vanished.

Second Part of the Trick. You now throw the handkerchief over the knee and pick it up by the ring or cardboard, saying the words "Mysto Magic" and it again takes the shape of the glass, giving your audience the impression that it has returned. Again you vanish it. Then you ask a spectator to come on the

stage and you will show that you can bring the glass back, right in front of their eyes.

You have the spectator stand facing the audience and approach him from the left, grasp the ring again and apparently take the glass from the spectator much to the delight and edification of the audience. Still holding the prepared handkerchief by the ring, you walk around the spectator, who is facing the audience, and while passing behind him it is a simple matter to remove the glass from the prepared pocket and smuggle it under the handkerchief, which is thrown over his shoulder, and the glass is produced. Some conjurers have actually let the spectator remove the handkerchief. It is necessary to remove the celluloid top or glass disk. This is palmed in the hand and it is an easy thing to do, because everyone is watching the glass and the spectator. While giving the glass for examination you have ample opportunity to dispose of the disk either in your pocket or on the table.

Some performers, after having secretly placed the glass disk on the glass again, turn the glass upside down without any water spilling out. You can actually throw the glass of water into the air, much to the astonishment of the audience, but this, to my mind is not advisable, because it gives some real astute person the idea that the glass can be manipulated without any danger of the contents spilling. The fact which seems to appeal to most people is that you have actually vanished a full glass of water without spilling it, and that is the greatest secret of the trick.

As a trick by itself the turning of the glass upside down is a good one, but I would not advise it in connection with the disappearing and reappearing glass of water.

Another trick with the magic glass of water is as follows: Before the performance you put the celluloid disk over the glass. You then show the audience a full glass of water and cover it with a piece of paper. Tell them that according to the laws of hydraulics the paper will hold the water in the glass, but no law of hydraulics will keep the water in the glass, after removing the paper, and that is where your magic power comes in. Tip the glass upside down and slide the paper off, and much to the astonishment of the audience the water will still stay in. The celluloid disk, of course, is invisible at a short distance.

THE VISION OF BELSHAZZAR

This is a most novel and startling combination trick which, although not dependent for its effect, in a large measure, on the aid of chemistry, it will, nevertheless, make a capital finale to a performance of Chemical Magic, or rather, a program of magic in which you may have introduced several of the tricks de-

scribed in this book. It will make a splendid climax to a series of tricks with cards and it should, whenever possible, be used as the closing number.

The basic idea of this trick is susceptible of many splendid combinations and its presentation may be varied to suit the artistic temperament of the performer. As a demonstration of the existence of so-called "astral spirits," it can be performed so that it will be much talked of wherever presented. As a regular magic trick, in combination with card tricks, it lends itself so well to a display of dramatic effect as to easily become the feature of the show. We will describe its effect as presented in conjunction with tricks with cards.

Effect. The magician calls attention to a large, unprepared wooden frame, on which he tacks a large square sheet of white paper. This frame he now sets on a clamp or holder which, in its turn, sets on a sheet of glass held in a vertical position. He further emphasizes the fact that the glass rests on a wooden stand, entirely isolated, and as no covering of any kind is resorted to, it is clearly impossible for any human being or material agency in whatever form, to approach or come in contact with the paper without the fact being detected by the spectators.

The operator now approaches the audience, and, from a pack of cards which has just been handed to him by his assistant, he requests a spectator to select a card. After the card has been shuffled back into the pack, the performer remarks that he is about to offer a demonstration of a most astounding nature, as, in fact, it is nothing less than an actual representation of the "writing on the wall," the famous "Mene Tekel Upharsin" of biblical renown. He makes a brief allusion to prophet Daniel's interpretation of the vision of the Babylonian king, Belshazzar, and upon the conclusion, the magician turns around to face the isolated frame, pronounces the words "Mene Tekel Upharsin" in a commanding voice, and he no sooner finishes his incantation than the most astounding thing imaginable takes place—the audience see the name of the chosen card appear instantly, written in letters of fire upon the sheet of paper stretched on the frame.

Explanation. The card chosen is "forced"; that is to say, it is a card which the performer, in an adroit manner, forces the person to choose without his design being detected. The name of the card to be forced is written on the sheet which is afterwards tacked on the frame, using a solution of six "measures" of potassium nitrate and one-half "measure" of gum arabic in about four table-spoonfuls of water, applying this with a fine camel's hair brush. This writing, upon drying, will be invisible, but when a flame or spark is touched to any one part of the writing, the whole will take fire as though it were a gunpowder fuse.

The spark is produced by means of an electrical equipment, as described

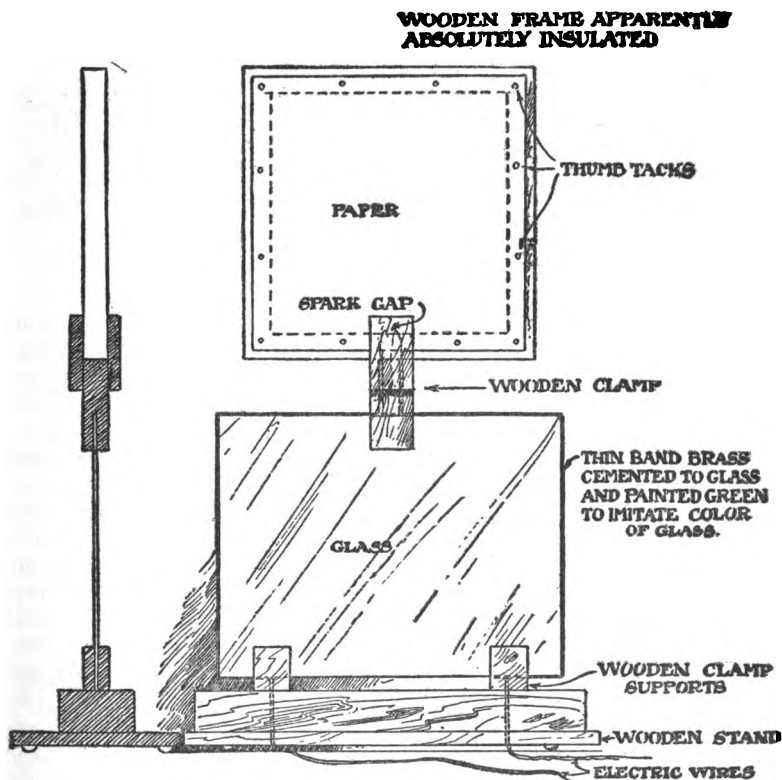


Fig. 10

in the trick "Fiat Lux," on page 26 of this book. The accompanying illustration is more or less explanatory and it will be seen that the electrical current is carried to the frame through a clever arrangement of breaks and contact points in the circuit. The wires which pass through the base, end on the glass supports and connect with the copper band on the edge of the plate of glass. The wiring in the upper double clamp is similarly prepared to enter into contact with the wires in the frame. The spark occurs at the end of the two wires in the frame and at this point it is well to place a tiny folded piece of "flash paper" to insure quicker results.

If care is taken that the spark is applied only to the writing, there will be no danger that any other part of the paper will catch fire. However, to make sure that the fire will not spread beyond the lines of the writing, it will be well to paint the paper outside the lines of the writing with water glass (sodium silicate), which will make fireproof the parts of the paper covered with it.

The writing is done in large letters, taking care that all these are joined, and, also, that a "lead" is made to the point where the spark is produced.

GROUP III

MISCELLANEOUS EXPERIMENTS

In addition to the tricks that we have just described and from which you may select some of the best for an evening's performance, we describe below, among other things, some interesting chemical reactions which you may use to mystify your friends, or at least show them some experiments and have some fun.

THE MAGIC ROSE

Fill a glass with water, and add five "measures" of cobalt chloride. Secure a paper rose, white or pale pink. Wet the rose with the cobalt chloride solution. Now allow it to dry. Saturate it again with the same solution. Repeat this two or three times. When dry, it is supposed to be a pink rose. When you are ready to exhibit it, you call attention to the color, and, in performing the trick you should stand near a stove or radiator so that you can expose the rose to the heat, covering it over with a handkerchief, in a natural way, as though you were using the stove or the radiator for a place on which to lay the handkerchief. If the room in which you are performing the trick does not contain a stove or radiator, any other type of heater will serve to furnish enough heat. Put the rose behind your back, bringing it close to the heat. The heat will turn the rose from pink or white to blue and you can turn it back to pink or white again by bringing it in contact with the steam from boiling water or by blowing your breath on it.

What Takes Place. Cobalt chloride has great attractive power for water. When dry, it is blue in color. If it is brought in contact with the steam from boiling water, it absorbs moisture which causes it to turn pink again. Heating it drives away the water and again turns blue.

CHEMICAL BAROMETER

The knowledge relative to the properties of cobalt chloride will be of interest to you because you can then make and understand the chemical barometer.

If you soak in a saturated solution of cobalt chloride strips of white crepe paper and after allowing them to get thoroughly dry you hang them outside exposed to the air, you will have improvised a dependable barometer, for their change of color will prove sure indications as to what kind of weather to expect. If their color is pink you then know that there is moisture in the air and that rain is near. When their color is blue, the presage is of fair weather, as you then know that the air is dry.

This is a very interesting little experiment, and you can really have much fun with it.

THE MAGIC PICTURE

If a landscape scene is painted using a strong solution of cobalt chloride to paint the sky and a solution of copper sulphate to paint the grass, a pretty effect can be secured on heating the picture. The scene seems to change from summer to winter. The heat changes the pink sky to blue and the green grass changes to white. On cooling, the summer scene returns.

Chemical Explanation. Copper sulphate acts like cobalt chloride. On heating, it loses water of crystallization and turns colorless; while the cobalt chloride turns from pink to blue.

THE MAGIC POWER OF MENTAL CONCENTRATION

Changing the color of a piece of cloth or paper while being held by a spectator.

Take a piece of paper that has been saturated with cobalt chloride and dried; then apply heat and it is blue. Next, ask someone in the audience to hold it tightly in his hand. While he is holding it, tell him to concentrate his mind on the thought of color and press the object tightly in the palms of his hands, when he will squeeze the color out of it. Do not let him open his hands while you are making the little speech about concentration of mind over matter. You wave your wand about him and pronounce the mystic words, "Mysto Magic," and then tell him to open his hands and the paper or cloth has turned pink.

What Took Place. As you can readily imagine, the cobalt chloride absorbed the moisture from the person's palms which turned the color from blue to pink. Remember that the color can be brought back by heating again.

THE MAGIC OF AMMONIA

Place three "measures" of ammonium chloride in a glass. Smell it and also allow your friends to smell it, noting the fact that no odor is present. Now, to the ammonium chloride add three "measures" of calcium oxide with a few drops of water. This makes a paste of it. If you will let your friends smell of the mixture, they will find a strong odor of ammonia coming from it, while in the beginning there was no odor at all.

Chemical Explanation. The calcium oxide reacts on the ammonium chloride, liberating ammonium.

cigarette at the time the magician presses on the lever upon producing the bowl, and the effect is, indeed, very mysterious.

WATER AS A POLYCHROME INK

Prepare several sheets of white paper in the following manner: On about a third of the number of sheets you intend to prepare, rub thoroughly, using a small wad of cotton or piece of cloth to rub with, a mixture composed of one-half "measure" of tannic acid and one-half "measure" of ferric ammonium sulphate. Be sure that your hands are perfectly dry, and, in fact, that no moisture comes in contact with the sheets. After rubbing this mixture well, shake off from the sheets the excess and lay them aside in a dry place. On the upper right hand corner you may make a pencil mark, as, for instance, a little dot so that you may tell these apart from the other lots.

A second lot you may prepare by rubbing the sheets in the same manner as indicated for the first lot, but using this time a mixture of one-half "measure" of sodium ferrocyanide and one-half "measure" of ferric ammonium sulphate. Mark the sheets with, say, two dots on each of two opposite corners, so that you may be able to identify them.

A third lot of sheets is prepared by rubbing them with a mixture composed of one-half "measure" of sodium sulphocyanate and one-half "measure" of ferric ammonium sulphate. This lot of sheets you may be able to identify later on if you make three small pencil dots on two opposite corners.

Now you hand to each of three spectators a clean pen and give them water as the writing ink to write with on the sheets. These, to them, are unprepared. The writing done with water with a clean pen on the sheets marked with one dot will be black. The writing on the sheets marked with the two dots will be blue, and the writing on the sheets with the three dots will be red.

Be sure that the pens are clean and that the sheets are not touched by moist fingers. In fact, it is the moisture combining with the chemicals with which the sheets were rubbed that causes the chemical reaction which brings out the different colors.

SYMPATHETIC INKS

In Group I of this book we describe several experiments based on the use of so-called sympathetic inks. It is interesting to know that there are several things to be found in the home to which we may resort in a pinch to produce a sympathetic ink, when for some reason or other, chemicals are not to be had. For instance, lemon juice makes a fairly good sympathetic ink provided the

writing is done with a clean pen. Upon drying, the writing will become invisible, but will be made visible upon heating the paper.

Milk will also make a fairly good sympathetic ink provided the writing is done with fairly heavy lines. The appearance of the writing will be obtained by heating the paper.

Writing done with vinegar will be invisible until brought out by heating, and one of the features of this writing is that it will not disappear after the sheet has cooled.



Fig. 11

MAGIC STARS FROM THE CANDLE

To perform this interesting experiment, file off some metal from the end of a poker. To the surprise of everyone these filings are combustible as may be readily demonstrated by sprinkling them over the flame of a candle. They actually take fire as they reach the flame, the particles burning like stars, producing miniature fire-works. (See Fig. 11).

This verifies the fact commonly known in chemistry that iron in a solid mass will not burn, but when it is divided up into small particles it takes fire readily, even more so than things that are conceded to easily burn. It is not absolutely necessary to take the iron filings from the end of a poker. They can be secured from many other sources, but we have referred to the poker, because the poker, in its regular form, is considered by most people to be non-combustible, and, as a magician, you can demonstrate that it is not true—you can make the poker burn.

MAGIC CRYSTALS

This will hardly fit into a magic entertainment, but some fun can be had with it and it will be found interesting.

1st. Take four "measures" of ammonium chloride and a tablespoonful of water and stir them.

2nd. Allow the ammonium chloride to dissolve, and while it is dissolving get a small mirror or window glass.

3rd. With a piece of paper, feather or brush apply the solution to the glass and give it time to dry.

4th. When it is evaporated, beautiful crystals will form on the glass appearing like frost.

What Took Place. Ammonium chloride crystallizes out when the water evaporates.

MYSTO MAGIC PAPER

Pink and blue litmus paper are about as near magical as anything in chemistry. They are always interesting to the student of chemistry. The uninitiated who do not understand it or know anything about it are fascinated and interested because of the color changes which the papers are made to undergo.

First, take a piece of blue litmus paper and wet it with tannic acid and it will instantly turn pink. If pink litmus is wet with an alkali, such as calcium oxide solution, it will turn red. It is very useful in chemistry and tells the difference between acids and bases. Tannic acid is an acid; calcium oxide is a base.

IS A GLASS EVER FULL?

Effect. A glass is filled brimful of water and to the astonishment of everyone you are able to put a quantity of material into the water without its overflowing.

How It Is Done. It is true that solids that are insoluble in water will cause the glass to overflow, but if certain materials that are soluble in water are placed in it, you do not increase the volume of the solvent. This can be demonstrated

by heating a little water and saturating this solution with three ounces of sugar; then put in two more ounces of salts of tartar; then an ounce and a drachm of green vitriol; six drachms of nitre; six drachms of sal ammoniac; two drachms of alum and a drachm and a half of borax.

When all these chemicals are laid out in these proportions before you experiment and you gradually add them one by one in the order and quantities above given, it is really quite mystifying and people cannot quite understand how you can add these materials without increasing the volume and causing the water to overflow.

You have no doubt discovered that the salts used are anhydrous—free from water. Salts can be rendered anhydrous by drying them at a high temperature.

The above is more of an experiment than a trick and could hardly be included in a magical performance. However, we will advise that you do this interesting experiment. The chemicals may be easily obtained from a chemist.

THE MAGICALLY SUSPENDED RING

Into a wineglassful of water put a teaspoonful of salt. Now secure some coarse sewing cotton, say about No. 16, and place this in the solution leaving it there for an hour or so. You then remove it and dry thoroughly. Now you are ready to do a very astonishing little trick.

Effect. You borrow a small, light ring, a wedding ring for instance, onto which you tie the thread and then hold the other end of the thread up. You now set fire to the thread and, to the astonishment of everyone, even though it is burned, the ring is still suspended in the air.

What Happened. The ashes of the cotton formed a combination with the salts in the thread that is similar to a fine film of glass.

RAINBOW FLASHES

Much will be done to start a performance of magic in the right direction if, preceding the appearance of the magician, the stage is illumined with flashes of lights of different colors in rapid succession. This may be accomplished as follows:

Place upon a small tin pan, arranged into a heap, a mixture composed of one "measure" of strontium nitrate, two "measures" of potassium nitrate, one-half "measure" of sulphur, and two "measures" of powdered charcoal.

Carefully arrange in a small heap in another little tin pan, not very far from

the first one, a mixture composed of one-half "measure" of powdered table salt (sodium chloride), one-half "measure" of sulphur, two "measures" of potassium nitrate, and two "measures" of powdered charcoal.

In a third tin pan place another heap made of a mixture composed of two "measures" of powdered zinc, two "measures" of potassium nitrate, one "measure" of powdered charcoal, and one "measure" of sulphur.

Connect the three heaps carefully with a chemical fuse prepared by soaking an ordinary white string, three or four feet long, in a solution of potassium nitrate prepared by dissolving six "measures" of potassium nitrate in one-half ounce of lukewarm water. When you know the string is thoroughly soaked, take it out and hang it to dry and the fuse is ready for use.

Connect, as already stated, all the heaps with the fuse, leading the long end to a place behind the wings on one side of the stage where an assistant will be able to set a match to it shortly before the appearance of the magician. The fuse will burn readily and will ignite in succession the three heaps of chemicals, and each one burning will give out lights of various colors. The first heap, the one containing the strontium nitrate, will burn with a red flame, the second, containing table salt, will burn with a yellow flame, and the third heap, the one containing zinc, will burn with a green flame. This is due to the fact that the metallic salts of strontium burn with a red light and the metallic sodium and its compounds give a yellow light, and zinc gives a green light.

Another Method. By dissolving boric acid in alcohol and pouring the solution in a saucer containing a light cover of dry sand, when set afire, the alcohol will burn with a green flame. A red flame may be obtained by dissolving strontium nitrate in alcohol and burning this in sand. The solution is poured on the sand so as to prevent the alcohol from burning too rapidly.

CHEMICAL FLASH

Place on a tin pan, arranging in a heap, a mixture made of one "measure" of magnesium, one "measure" of potassium nitrate; over this pile sprinkle a "measure" of sulphur. Light this pile by means of the chemical fuse which is explained in the chapter about "Rainbow Flashes," keeping yourself at a distance, so that there may be no danger of your burning your fingers or face. The result will be a very brilliant flash.

TUBE LENGTHS FOR "ACID TUBES"

In the chapter about "Flash Paper," we spoke of thin glass tubing to be cut in short lengths used in the preparation of the so-called "acid tubes." We will describe a very effective method of cutting the glass tubing.

With a sharp, three-cornered file make a scratch about one-third around the tube. Hold the tube between your hands, with the thumbs on the opposite side where the scratch comes, and push the thumbs outward, just as you would if you would have a pencil between your fingers, and wanted to break it in two. It will be seen that in the majority of cases, a clean, sharp cut will result.

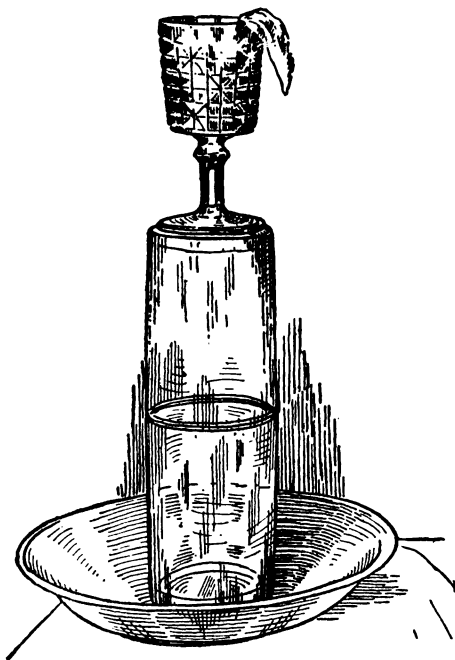


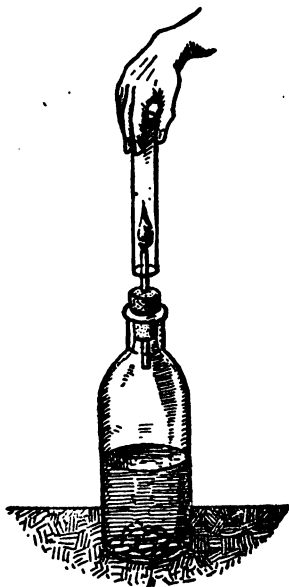
Fig. 12

CURIOUS EXPERIMENT

The following little experiment illustrates capillary attraction, but as you have use for so many liquids in your Chemical Magic entertainment the following will be worth knowing and will certainly prove very interesting and fascinating.

Fill with water two tumblers of the same size, standing one upturned on top of the other, mouth to mouth, while full of water. (See Fig. 12.) You may do this by placing them in a basin of water, bringing their rims close together after

they are full and then remove from the basin. They are placed in the position as shown in the illustration. A third glass is placed on top of the other two which are filled with water, the water being held in position by the pressure of the air. Into the third glass you place spirits of wine into which some aniline dye, such as potassium permanganate, can be dissolved, giving it a reddish color. Note the illustration for the method of inserting a strip of cotton cloth which has been moistened in the liquid to act as a syphon. This draws the contents of the top glass away, making the liquid run down on the outside of the upturned glass, until it meets the junction of the rims. Here capillary attraction enters into action and the spirits of wine being lighter than the water rises to the top of the upturned glass, and the water which is being displaced by the lighter liquid runs out between the rims and flows down into the plate on which the glasses are standing. This action continues until the contents of the glass on top has been exhausted and the water in the lower glasses remains perfectly clear. This is a fine, little experiment.

**Fig. 13**

THE MUSICAL FLAME

This is a very interesting experiment; however, we do not recommend boys to handle the chemical used unless they are exceptionally careful. I should recommend, if you try this experiment, to do it under the supervision of your parents. It is too good an experiment to overlook, but a dangerous one unless great care is used.

Take a good-sized bottle and have a cork that will fit the bottle well. (See Fig. 13.) Burn a hole in the cork and into it put the stem piece of a tobacco pipe about eight inches long. Prepare the bottle contents as follows:

Put into it two or three ounces of zinc in small pieces (zinc cuttings from a zinc worker.) On top of this pour water, just enough to cover the cuttings; add to this fifteen to twenty drops of sulphuric acid; rapid effervescence will follow and then gradually subside, but the boiling continues for a period. As soon as the action becomes regular, the cork into which you have inserted the pipe can now be placed into the neck of the bottle and if a match is touched to the end of the pipe a flame will be produced which will continue to burn as long as there is any action in the bottle.

What Has Happened in the Bottle. Hydrogen gas has been produced as a result of the decomposition of the water by the acid and zinc. Now you take a metal pipe or glass tube, about sixteen or eighteen inches long and one-half to three-quarters in diameter. By placing the tube over the flame, allowing the pipe to be about three to five inches above the tube and holding it perfectly steady and upright, a beautiful sound will be produced, resembling an organ. This sound will vary according to the diameter of the tube.

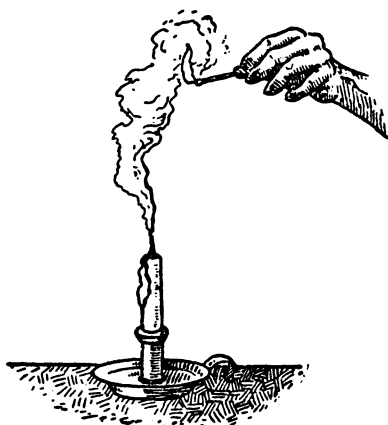


Fig. 14

LIGHTING A CANDLE WITHOUT TOUCHING THE WICK

There are a number of times during an entertainment when you have use for a burning candle. The following little experiment can be worked as a side stunt that will be very much appreciated. After the candle has been burning, it should have a good long snuff. It should now be blown out with a sudden puff. Following this you will notice that white smoke will curl up from the hot wick. If you light a match and place a flame to the smoke at quite a little distance from the candle, say two or three inches, the flame will run down the smoke and relight the candle in a very astonishing manner. (See Fig. 14.)

Note: This trick should be performed in a room where there is no draught.

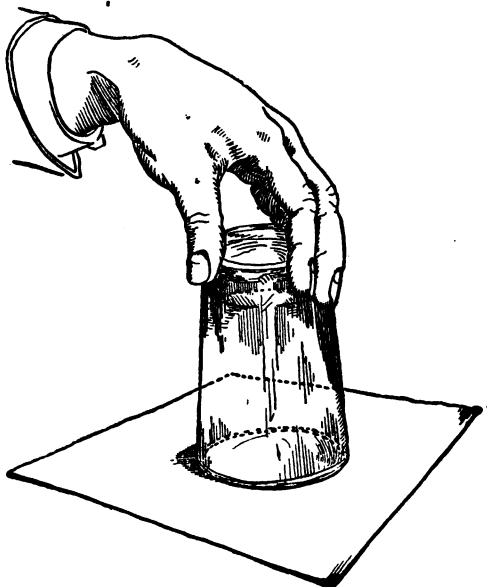


Fig. 15

PLACING A GLASS OF WATER IN SUCH A POSITION THAT NO ONE CAN REMOVE IT WITHOUT UPSETTING THE WATER

This stunt fits well in a program of Chemical Magic. It will be readily appreciated that where so many glasses are used a little side fun can be created with an experiment of this kind.

First, make a wager that you can place a glass of water on the table in such a position that no one can remove it without upsetting the water. Fill a glass with water and place a piece of paper over the top and edge of the glass. This enables you to turn the glass upside down, putting the palm over the top when doing so. Withdraw the hand and let the top of the glass rest on the table. (See Fig. 15.) It is essential that the top of the table and also the edge of the glass be quite smooth, so that there will be no open spaces around the edge of the glass. Carefully withdraw the paper and the water still remains in the glass, because the air cannot enter. You can now ask the skeptical ones to come forward and see if they are able to remove the glass without spilling the water.

What Keeps the Water In. The pressure of the air keeps the water in the glass.

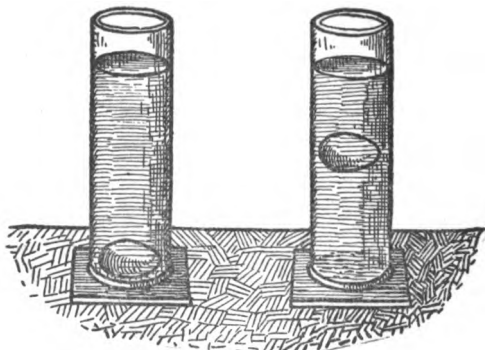


Fig. 16

THE MYSTERIOUS EGG

The following is a nice little experiment, belonging to those classified as experiments in Natural Science, which can be used to produce great fun either as an experiment or a magic trick and it also harmonizes quite nicely with Chemical Magic.

Effect. You have standing upon the table two cylinders or tall glasses filled with ordinary clear water, which you call to the attention of your audience. You then pass two eggs for examination and ask someone in the audience to

write on one of the eggs the word "Suspend" and on the other the word "Sink." Place one egg in one glass and the other egg in the second glass. The egg marked "Sink" will drop to the bottom of the glass and the egg marked "Suspend" will be mysteriously suspended halfway down in the other glass. (See Fig. 16.)

How the Trick is Worked. Take one pint of water and dissolve in it as much salt as it will take up. This makes what is called brine. With this solution fill one of the tall glasses to the halfway mark; into the remaining half of the glass pour plain water.

Note: It is important that the water be poured down the side of glass or into a spoon to break its fall. This will cause the water to float on the brine as it is lighter, and the appearance is that the two liquids are the same and will pass for water.

The other tall glass is filled with pure water. Into the brine water you place the egg marked "Suspend"; into the plain water the egg marked "Sink." The egg in the brine water will suspend itself halfway down, while the other egg will sink to the bottom.

WHICH IS THE BOILED EGG?

And now that we are on the subject of eggs, we will describe another pretty trick with them. The audience always appreciates the performer who can do various little things with the same objects. It keeps you from introducing too brusque a change in your entertainment. That is why it is always better in giving a magic entertainment to do the tricks in series, for instance, tricks with chemistry, following these with handkerchief tricks, then card tricks, etc.

For this trick you require a number of eggs on a plate, one of which is hard boiled and all the others raw. You then ask the audience if they can detect the hard boiled egg without breaking any of them. From outside appearance, this is impossible except by guess. There is only one way that this may be done and that is by spinning the eggs. Those that are raw or semi-liquid will spin with a sort of waddling motion, while the boiled or solid egg will spin like a top and even "go to sleep."

WHAT A GLASSFUL OF WATER WILL HOLD

Fill an ordinary glass full of fine cotton wool and another glass standing beside it full of water.

Now make a statement that, contrary to what is generally understood to be true, you are going to put the contents of both of these glasses into one glass

without increasing the volume of the water; that is, without making the water spill over the brim of the glass. You now take out the cotton and very gently lay it down into the water, and to the astonishment of everyone, it will be found that the glass will hold all of the water and the cotton that before took up two glasses.

Special Note: To avoid any natural grease that may be adhering to the cotton it is absolutely necessary to clean it thoroughly by boiling the cotton in an alkaline solution such as soda. Then dry it out thoroughly and it will comb into its flaky form again.

TO CHANGE THE COMPLEXION FROM WHITE TO BLACK

Prepare a tumbler containing water saturated with sulphurated hydrogen gas. If the performer's face is covered with oxide of bismuth, the chemical name for what is known as pearl white, which is commonly used to give the skin a fair appearance, and the glass containing the saturated solution of sulphurated hydrogen gas is held close to the face, a very startling effect will be produced, in that the face will turn black.

Explanation. The sulphurated hydrogen gas reacts on the bismuth to form bismuth sulphite, which is a black precipitate.

DIABOLICAL ODOR

Along during the performance, while presenting some trick with eggs, a little comedy may be introduced by stating that one of the eggs doesn't smell good; in fact, it is rotten. To convince the audience that such is the case, you may have your assistants prepare, either in an adjoining room or behind the scenes, a solution composed of three "measures" of sodium bisulphate and two table-spoonfuls of water, mixed in a wineglass. The smell, resembling that of rotten eggs, will be given off by the solution by adding to it two "measures" of iron sulphide. In this reaction, hydrogen sulphide gas is formed. In fact, the hydrogen sulphide given off by rotten eggs is what gives them their fetid odor. The fumes from the solution may be thrown towards the audience by using a pair of bellows, carefully concealed.

Another way to introduce this chemical experiment is by advising the audience that you have succeeded in discovering a gas which if it had been used at the time of the great war, it would have caused a speedy defeat of the enemy, as they surely could not have withstood its mortiferous effect. To prove it, proceed with the preparation of the solution as already described. Of course,

you have to make it plain that as only a small portion is used, a small quantity of gas will be produced, and no fatalities will result. A further convincing proof of the supposed fatal strength of the gas may be given by holding over the glass a clean silver coin, which will tarnish after a few seconds of exposure to the fumes. The "tarnish" is silver sulphide, which is a black precipitate formed by the action of the sulphurated fumes on the silver.

With a nice line of light, jocular "patter," this experiment may be made to do as a fine comedy stunt, which will be very much appreciated. Needless to say, the gas produced in this way, while very offensive, is not harmful.

MAGIC WRITING

A very interesting experiment in natural magic is made by exhibiting an ordinary plain piece of glass, calling attention to the fact that it has no lines or markings of any kind. It may be examined very closely, in fact, minutely. By simply breathing upon it, a multiplicity of lines running in all directions and forming all sorts of fantastic figures immediately appear and they likewise disappear as soon as the moisture from the breath evaporates from the glass. The committee may wash the glass thoroughly, but the experiment still works.

How It Is Done. A plain piece of glass is prepared with hydrofluoric acid, which, by the way, is an acid that can be prepared by dissolving some powdered flourspar in ordinary sulphuric acid. Then by dipping a pen into the acid, draw images or pictures or designs on the glass and allow the writing to dry. The glass may then be thoroughly washed and dried and when breathed upon the designs will appear.

What Happens. The acid eats into the glass, and if left too long it will eat too deep and the trick will not be effective.

Another Way. A very simple experiment can be accomplished by the use of French chalk, writing with it on ordinary looking glass.

After writing on the glass in this way, the glass is polished with a silk handkerchief which has the effect of making the writing disappear, yet if the glass is breathed upon as in the above experiment, the writing will re-appear. It may be polished and the experiment repeated.

THE MAGIC OF SUPERFICIAL TENSION

Effect. In a bowl of water arrange some matches around the center, forming a pointed star. Now, take a piece of soap which you have sharpened at one end and place it in the center, when something mysterious will take place. The

matches will apparently take fright at the soap and will scatter to the outside edge of the water.

Some nice "patter" can be worked up in conjunction with this by saying that matches are like human beings—they abhor soap—and to prove further that they are like human beings, they can be enticed back to the center of the bowl again if you will offer them a little sugar. Simply take a lump of sugar and dipping it into the center of the water, the matches will gladly journey back toward it.

Why Is This So? Soap diminishes the elasticity of the surface, creating a disturbance in what is known as "superficial tension," whereas the introduction of sugar into the water by capillary action produces a current which brings the matches back to their starting point.

THE MAGIC FLAGS

On a sheet of white paper, draw the American flag with faint pencil lines, and with a soft brush paint the parts to be blue with a solution made of one "measure" of sodium ferrocyanide in two tablespoonfuls of water. The parts to be red paint with a solution made by dissolving one "measure" of sodium sulphocyanate and four tablespoonfuls of water. On another sheet, outline the flag of France. Paint the parts to be blue with sodium cyanate solution. After the sheets are dry, if you rub a wad of cotton soaked in a solution made of one "measure" of ferric ammonium sulphate in two tablespoonfuls of water, the blue and red of the flags will be brought out with a very pretty effect.

MAGIC SUGAR

Effect. A glass of water is handed to a spectator and he is asked to drop into it a lump of sugar. As would be expected, the sugar will sink to the bottom of the glass, but to the surprise of everyone it comes up again to the surface and majestically floats about.

How It Is Done. Take some ordinary lumps of sugar and dip them into some collodion. Do not hold it in for any length of time, but, by means of a candy prong, simply dip each lump in and take it out quickly. Then place it over a radiator or some dry place all day and night. This gives the ether time to evaporate.

Warning. Do not put the sugar where it is too hot because all that you want to accomplish is to evaporate the collodion.

After the drying, the sugar will have the appearance of ordinary sugar and no one will detect that the lumps are prepared.

What Takes Place. As you may suspect, the sugar has dissolved and what is left is the framework of collodion that entered the pores of the sugar when you were

preparing it. When the sugar was still intact the specific gravity was enough to take it to the bottom, but when the sugar was dissolved, the specific gravity was lessened and the loaf comes to the top, because collodion floats, its specific gravity being less than that of water.

THE CAMPHOR SCORPION

This is an old and familiar trick in natural magic, but it still fascinates those who see it done.

Effect. You fill an ordinary tumbler with water and get some lumps of camphor of different sizes. This can be purchased for a few cents at a drug store. Arrange the floating lumps of camphor in the form of a scorpion. In a comparatively short time, the imitation scorpion will begin to take life and he will go swimming about wagging his tail and limbs in the most life-like manner.

Why Does This Happen? Speaking in the terms of physics, the explanation is that camphor has the same specific gravity as water, and also that camphor does not dissolve in water.

It will be noted that the camphor lumps cling to one another as though they were chained together. This is explained by the physical property of cohesion. According to the physicist, the many movements that our animal goes through are accounted for by the force known as superficial tension. The chemists say this force is due to the giving off of vapor by the camphor in the water, which causes elasticity.

PHARAOH'S SERPENTS

Place in a little heap on a tin can lid a mixture composed of four "measures" of granulated sugar, two "measures" of sulphur, and two "measures" of cobalt chloride. Place the lid over a candle flame or an alcohol lamp, holding the lid in such a way so that there will be no danger of your burning your fingers. In a little while the mixture will become moist and will start to burn, swelling up and shooting out in all directions until it will become many times as big as the original heap.

THE IMPROVISED HORSE CHESTNUT FLOATING TORCH

Here is something new in the way of making use of the horse chestnut, and one which you have probably never heard of.

Select a large horse chestnut, the more irregular in shape the better. Then place the chestnut in a tumbler half full of water and let it float on top, noting

and marking carefully the very center of the upper side of the chestnut. Remove the chestnut and after wiping carefully, bore it full of holes with a sharp darning needle and soak it in kerosene oil for about twelve hours.

When you are ready to use it, bore a hole in the exact center, which you noted and marked, and be careful not to bore this hole entirely through. Have some cotton in the hole you have just bored. Your horse chestnut candle is now complete with its cotton wick, and, if placed carefully in the glass of water making sure it will not tip, it is ready to be lighted and will remain lighted all night, shedding a steady glow which is just the thing to use for a night light in a sick-room.

THE MAGIC MOVING TUMBLER

We will now proceed to cause an empty tumbler to move along a marble surface without touching it with our hands or blowing upon it, in fact, we will cause it to move along without any apparent motive power much to the astonishment of your spectators.

You will need a marble slab for this experiment, and the top of an old-fashioned chest of drawers or parlor table will do very nicely. Now rest this on top of a table in a slightly inclined position. To do this it will only be necessary to place a few strips or blocks of wood under one end of the slab.

Now, before placing the tumbler upside down on the marble slab, be sure to wet the edges of the glass very thoroughly. They must be wet thoroughly, make no mistake about this. Then place the tumbler on the marble slab, upside down, of course, near the edge of the highest part of the slab. To accomplish this, proceed as described in the experiment "Placing a Glass of Water in Such a Position, etc." The inclination of the marble slab should be so slight that the glass will not slip down it before you are ready to go ahead with your trick.

Now light a candle and place it close to the glass for a few minutes. In a few seconds the glass will begin to slide across the marble. The reason for this is that air under the glass when we began the experiment has expanded on account of the heat applied with the candle and this expansion has caused the glass to rise, so slightly, of course, that it is not perceptible, and the water on the edge of the glass prevents the air from escaping, so that the glass is really not resting on the marble slab but on the thin surface of the water and it consequently begins to slide along the surface of the slab.

CHEMICAL BUTTERFLIES

This is a simple and interesting exhibition and well worth the effort. You will need a wide-mouthed bottle, a hollow cork, and a funnel; also a few ounces or tartaric acid and bicarbonate of soda and two or three little balls of elder pith or common cork.

Half fill the bottle with water and stop the mouth of the bottle with the hollow cork. Then place the pipe end of the funnel through the cork and seal the openings between the bottle and the cork, and the cork and the funnel with sealing wax, making sure that these are air tight.

Then throw in a small quantity each of both powders which will immediately cause the liquid to foam and froth as a result of the creation of carbonic acid gas which tries to escape through the funnel.

Have prepared small butterflies cut from colored paper and glue the little cork balls to the center of the butterflies. As soon as the liquid begins to effervesce, drop these butterflies into the funnel and watch the effect.

One of these little balls, or butterflies, having through force of gravity fallen into the small opening of the funnel will prevent the flow of gas for a few seconds, but, as the gas gains strength, it will lift the ball up and out of the aperture but only to allow another, or the same ball, to drop back in again, and again shutting off the flow of gas for a few seconds. Then this action will be again repeated, and again, producing a very odd and pretty effect.

The wings of the paper butterflies will appear to wave and flutter and rising and falling up and down in the funnel will appear real and life-like. A glass funnel is especially recommended for this experiment as the butterflies are then always in view.

MAGIC WATER

The following is a very simple and interesting exhibition.

Procure a basin full of water and some powdered lycopodium, which you can obtain at any drug store.

Borrow a ring from one of your spectators and throw it into the basin of water in full view of your audience. Then announce that you are going to thrust your hand in the water and recover the ring without getting your hand wet.

This, of course, will seem utterly impossible and arouse the curiosity and interest of your spectators. Have the powdered lycopodium handy and after throwing a handful of this powder on the water thrust your hand in and pull out the ring, handing it back to the spectator and at the same time exhibiting your hand which will be as dry as it ever was.

The reason for this is that the lycopodium has formed a waterproof covering on your hand which the water cannot penetrate.

TANTALIZING MATCHES

If you paint a ring about one-half an inch wide just below the head of a regular wooden safety match, using a soft brush dipped in sodium silicate, or water glass,

allowing it to dry, upon the match being ignited, it will immediately go out, as the painting done with water glass will make the wood fireproof. You can have quite a little fun with a box of matches prepared in this way, handing it to someone who may wish to make a light, as it is quite comical to watch his expression of disgust and disappointment at his futile efforts to get a light after striking match after match.

TRICK MATCHES

Dip the heads of ordinary wooden matches in water glass or sodium silicate, and before this is dry, sprinkle the water glass with sulphur, seeing that as much sulphur attaches itself to the water glass as possible. After the matches are dry, upon striking them they will sputter and smoke, but will not light readily.

THE ICE FACTORY

We believe you would like to know how to make artificial ice, as it is a little bit of knowledge which is not only interesting but it may prove very useful to you some sultry summer afternoon when a cool refreshment would be acceptable and the ice-man had failed to make his accustomed visit.

Select a medium-sized mixing bowl and set in this either a smaller bowl or a small, empty cocoa tin can; into the smaller bowl or can, put the clean water you would like to see made into ice. Cover the bowl or can and in the larger bowl put sulphate of soda (Glauber's salt), and hydrochloric acid (spirits of salts), in the proportion of eight parts of the sulphate to five parts of the acid. Throw over the bowl a clean piece of burlap folded two or three times, or any other kind of cloth. Within fifteen or twenty minutes you will notice that the water in the smaller receptacle has become frozen solid.

Explanation of What Has Taken Place. Ice, water or steam are the same substance but in different degrees of density, and this is determined by the more or less quantity of heat which it may contain.

The action of the acid on the sulphate produces an intense cold fifteen to seventeen degrees below zero, which, of course, is enough to freeze the water contained in the smaller vessel. The latent heat contained in the water is driven off and its appearance is changed to ice, which is just water robbed of its latent heat.

Equal parts of nitrate of ammonia and water will have the same effect.

Even ice or snow mixed with common salt in equal parts will produce a temperature around eighteen to twenty degrees below zero.

These combinations are termed in chemistry—frigorific mixtures.

While chemicals are mixed to produce the intense cold, it is clearly seen that the experiment of making ice is accomplished through a mechanical law, that is to say, we drive the heat off the water without any chemical change taking place in it.

Artificial ice, is, of course, identical in every respect to natural ice, differing only in the manner in which the latent heat from the water has been driven off.

The large plants of artificial ice produce this article in much the same manner as it is here explained, although, of course, in a more elaborate form.

Chemical Explanation. The mixture of the chemicals produces a negative heat of solution; that is to say, much heat is absorbed by the mixture. While the mixture itself rises in temperature, it does so on account of the heat it takes away from surrounding bodies.

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